Prevalence of Listeria monocytogenes in European cheeses: A systematic review and meta-analysis

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Publication date:
2017

Document Version
Peer reviewed version

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Title of presentation:

☐Improving efficiency ☐Green solutions
☒All-time high food safety ☐Healthy dairy products

Abstract (max. 300 words):
Both in Europe and worldwide cheese has cause important outbreaks of listeriosis and can be a vehicle for transmission of *Listeria monocytogenes* to consumers. A systematic review and meta-analysis were conducted using scientific literature and European Food Safety Authority (EFSA) reports to summarize available data on the prevalence of *L. monocytogenes* in different types of cheeses produced in Europe. Multilevel random-effects meta-analysis models were used to estimate mean prevalence rates of the pathogen and to compare prevalence between types of cheeses (fresh, mould-ripened, ripened, smear-ripened and brined) and for cheeses produced using pasteurized or un-pasteurized milk. Data from a total of 177428 samples were analysed. The mean prevalence during 2005-2013 and estimated from scientific literature (2.3%; CI: 1.4-3.8%) was more than two times higher than results from EFSA reports (0.9%; CI: 0.7-1-2%). The prevalence differed between types of cheeses including fresh (1.4%; CI: 0.6-3.2%), mould-ripened (2.0%; CI: 0.6-6.3%), ripened (2.2%; CI: 0.9-5.6%), smear-ripened (4.8%; CI: 1.5-14.5%) and brined (8.6%; CI: 1.7-34.4%). Mean prevalence of *L. monocytogenes* in fresh and soft/semi-soft cheeses were not significantly different ($P > 0.05$) for cheeses produced from pasteurized (1.0%; CI: 0.7-1.5%) or un-pasteurized (1.4%; CI: 0.9-2.1%) milk. Furthermore, this systematic review focused on groups/species of microorganisms suitable as indicator organisms for *L. monocytogenes* in cheeses to reflect the level of production hygiene or as index organisms to assess the prevalence of *L. monocytogenes* in cheeses. However, no indicator or index organisms were identified. These meta-analyses improve our understanding of *L. monocytogenes* prevalence in different types of cheeses and provided results that can be useful as input for quantitative risk assessment modelling.

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